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AFRL teams up to test SensorCraft wing

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WRIGHT-PATTERSON AIR FORCE BASE, Ohio — The Air Force Research Laboratory, Northrop Grumman Corp. and NASA teamed together on the High Lift/Drag Active (HiLDA) Wing Program to successfully demonstrate a 12-percent scaled model of a highly elastic SensorCraft concept wing.

During a series of wind tunnel tests at NASA's Transonic Dynamics Tunnel, scientists subjected the wing to conditions similar to steady, smooth flight as well as flight in more extreme conditions with erratic wind gusts. During the steady flight conditions, scientists reduced the wing's drag by making slow and deliberate adjustments of the wing's control surfaces in order to maximize its lift-to-drag ratio.

During the gusty conditions, scientists alleviated structural loads on the wing by continuously making small adjustments with the control surfaces. In the future, this ability will increase SensorCraft's capabilities and enable it to remain on station longer by enabling much lighter wing structures to endure encounters with gusts.

Engineers are developing the SensorCraft concept as a future intelligence, surveillance and reconnaissance platform that will collect intelligence using fully integrated sensors. In support of the SensorCraft concept, the HiLDA program will evaluate active wing technologies including active flow control, adaptive structure and active aeroelastic wing (AAW). This portion of the HiLDA wing program studied AAW's applicability to the SensorCraft concept.

AAW technology takes a traditionally detrimental condition, like the tendency of wings to warp or twist at high speeds, and transforms it into an advantage using elastic wings. AAW has traditionally been used to provide large amounts of roll power using conventional control surfaces. In this application, AAW is used to alleviate structural loads quickly during gust events and to twist the wing adaptively to minimize overall aircraft drag. AAW technology will enable thinner, higher-aspect ratio wings, which can greatly reduce air vehicle weight and improve performance. @

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